

and one for impoundment of water) from the North Carolina Department of Environment and Natural Resources (DENR) Dam Safety Program. The agency may also require that you prepare a sediment and erosion control plan to prevent excessive siltation if a stream is being impounded during construction. To ensure that your pond will conform to all state laws, contact the DENR Dam Safety Program (919-733-4574) or your nearest regional DENR office before beginning construction. Also check to see if local county or municipal ordinances require additional permits.

### **Drainage Area**

An important factor in deciding where to build a pond is the nature of the surrounding watershed or drainage area. Generally, a watershed pond built in pastureland requires 5 to 20 acres of watershed per surface acre of pond, whereas a pond constructed in woodland requires 20 to 40 acres. If the drainage area is too large, it may be necessary to construct a diversion ditch to channel excess water around the pond. If the drainage area is insufficient, the pond will not fill adequately and will be subject to water-level fluctuations and vegetation problems.

### **Water Source and Quality**

Potential water sources for a pond include surface runoff, streams, springs, and wells. Each source has advantages and disadvantages; the type chosen will depend to a large extent on where the pond is located. *Surface runoff* is rarely a source of disease or wild fish problems but leads to fluctuations in pond level during spring and fall. *Streams* are usually high in dissolved oxygen, but they also tend to fluctuate rapidly, are a source of silt, and are a potential source of diseases and wild fish invasions.

*Springs* are considered the most desirable water source because they have a constant temperature and flow rate, are very inexpensive to divert, are rarely a source of disease or wild fish problems, and are less likely to be affected by pollution. However, they may contain high concentrations of undesirable gases (hydrogen sulfide and carbon dioxide), and the high clarity of the water from most springs encourages vegetation problems. *Wells* offer good quality water and can be placed where convenient, but are expensive to drill and operate.

It is also important to consider land uses within the watershed where the pond is located, as these may degrade the water quality. Runoff from cropland can increase the amount of sediment reaching the pond and may cause turbidity. It may also contain potentially toxic agricultural chemicals, as well as fertilizers that can cause algal blooms and resultant fish kills. Runoff from pastures and livestock holding areas is rich in nutrients (animal wastes) that can also cause algal blooms and fish kills. Residential, urban, and industrial runoff may contain substances (such as industrial waste, chemicals, oils, and sediment from construction activities) that can adversely affect a pond's water quality. When planning a pond, therefore, be sure to consider the quality of the water source and factors that may affect it.